Silicon-carbon material battery performance

Does carbon coating influence silicon anode of lithium-ion batteries?
A well-defined silicon nanocone-carbon structure for demonstrating exclusive influences of carbon coating on silicon anode of lithium-ion batteries. ACS Appl. Mater. Interfaces 9, 2806-2814 (2017) Wang, B., Qiu, T., Li, X., et al.: Synergistically engineered self-standing silicon/carbon composite arrays as high performance lithium battery anodes.

What is multi-scale design of silicon/carbon composite anode materials for lithium-ion batteries?
Multi-scale design of silicon/carbon composite anode materials for lithium-ion batteries is summarized on the basis of interface modification,structure construction,and particles size control,aiming at encouraging effective strategies to fabricate well-performing silicon/carbon composite anodes. 1. Introduction

Is silicon a potential anode material for lithium-ion batteries?
Luo, W., Chen, X., Xia, Y., et al.: Surface and interface engineering of silicon-based anode materials for lithium-ion batteries. Adv. Energy Mater. 7, 1701083 (2017) Ashuri, M., He, Q., Shaw, L.L.: Silicon as a potential anode material for Li-ion batteries: where size, geometry and structure matter.

Which material is best for lithium-ion battery anodes?
Siliconis one of the most promising materials when it comes to lithium-ion battery anodes because of its high theoretical capacity and the low working potential versus Li/Li +. However,the drastic volume change during lithiation and delithiation leads to a rapid failure of the electrode.

What is the electrochemical performance of silicon/carbon composite?
The electrochemical performance are analyzed by half-cell and full-cell experiments. The results show that the silicon/carbon composite is core-shell structure with the silicon embedded graphite as core and organic carbon layers as the shell, the particle size range from 8 u m to 24 u m.

Could a silicon/carbon nanofiber/graphene composite be a high-performance anode for lithium-ion batteries?
Maximov We report the interfacial study of a silicon/carbon nanofiber/graphene composite as a potentially high-performance anode for rechargeable lithium-ion batteries (LIBs).

Two-dimensional, covalently bound silicon-carbon hybrids serve as proof-of-concept of a new material design. Their high reversibility, capacity and rate capability furnish a remarkable level of ...

3D microsphere structure silicon-carbon anode optimizes its performance in lithium-ion batteries by incorporating silicon and carbon materials into a 3D microsphere ...

Silicon (Si) is a representative anode material for next-generation lithium-ion batteries due to properties such

as a high theoretical capacity, suitable working voltage, and high natural abundance. However, due to inherently large volume expansions (~ 400%) during insertion/deinsertion processes as well as poor electrical conductivity and ...

6 ???· Silicon is a promising anode material for lithium-ion batteries due to its high theoretical capacity of approximately 4200 mAh g-1. However, its significant volume expansion (up to 300%) during charging and discharging cycles can lead to structural collapse and capacity loss, limiting practical applications. The porous carbon/silicon (C/Si) composite effectively combines the ...

As demands for battery performance and energy density continue to escalate, the development of advanced anode materials become increasingly pivotal. Traditional graphite anodes have reached the capacity limits and cannot fulfill the requirements of high energy density batteries 11, 12]. In contrast, silicon anodes, with their higher theoretical specific capacity (~4 ...

Abstract Yolk-shell structured silicon/carbon (YS-Si/C) anode materials show promise for commercial lithium-ion batteries (LIBs) because of their high specific capacity and excellent cycling life. ... Skip to Article Content; Skip to Article Information; Search within. Search term. Advanced Search Citation Search. Search term. Advanced Search Citation Search. ...

To overcome the existing rapid capacity decay, low conductivity and the expands and contracts in volume of Si/C composite anodes in lithium ion batteries, we have developed a silicon/carbon composite by spray drying ...

By combining the damping properties and high electrical conductivity of carbon materials with silicon"s high specific capacity and minimal ... In situ synthesis of a silicon flake/nitrogen-doped graphene-like carbon composite from organoclay for high-performance lithium-ion battery anodes. Chem. Commun., 55 (18) (2019), pp. 2644-2647, 10.1039 /c8cc10036e. View in Scopus ...

These results demonstrate that carbon coating can effectively improve the overall electrochemical performance of silicon, and the anode material made of hollow structure nitrogen-doped carbon layer-coated nano-silicon has a larger reversible capacity than that made without hollow structure (724 mAh g-1 reversible capacity at 0.05 A g-1) [30].

To overcome the existing rapid capacity decay, low conductivity and the expands and contracts in volume of Si/C composite anodes in lithium ion batteries, we have developed a silicon/carbon...

For higher performances of ACSC anode materials for LIBs, future research and studies may pay more attention to the following aspects: 1) Rational design of carbon skeleton: The carbon skeleton plays a crucial role in the electrochemical performance of ACSC structures. Different applications require specific structural characteristics of the carbon skeleton, such as ...

Silicon-carbon material battery performance

In this research, we explore the utilization of biomass-derived proteins, specifically from egg whites, as a novel carbon source for crafting silicon/nitrogen-doped carbon composites, aimed at overcoming the ...

Silicon is one of the most promising materials when it comes to lithium-ion battery anodes because of its high theoretical capacity and the low working potential versus Li/Li +. However, the drastic volume change during lithiation and ...

3D microsphere structure silicon-carbon anode optimizes its performance in lithium-ion batteries by incorporating silicon and carbon materials into a 3D microsphere shape. This integration combines the benefits of silicon and carbon materials, significantly enhancing the electrode"s electrochemical performance and cycle stability [108].

Multi-scale design of silicon/carbon composite anode materials for lithium-ion batteries is summarized on the basis of interface modification, structure construction, and ...

Silicon-based materials are promising materials for lithium-ion battery anodes with high specific capacities. However, the volume expansion of silicon during charging and discharging leads to the destruction of the material structure, increased mechanical stress, solid electrolyte interface (SEI) film rupture, and rapid capacity decay. Here, a composite material ...

Web: https://doubletime.es